DEVELOPMENT OF THE SYMPATHETIC NERVE.

ONODI, in a third paper on the above subject, gives many details of the earlier steps in the growth of the sympathetic ganglia, etc., from which the following may be concluded: The intervertebral ganglia are immediate products of the process of cell-proliferation occurring in the medullary tube. Both the anterior and posterior roots appear as fine fibres growing out of the medullary tube, the anterior being the first to appear. The sympathetic ganglia are the direct products of the process of cell-proliferation which takes place on the ventral aspect of the intervertebral ganglia. They are made separate ganglia by subsequent constrictions. The sympathetic cord is a secondary product, the result of an outgrowth from the adjacent ganglia. The visceral networks and ganglia are direct products of the sympathetic cord. Each sympathetic ganglion is connected with the intervertebral ganglion, the anterior root, and the anterior and posterior branches of the spinal nerves. The fibres from the spinal cord pass with a definite system to the sympathetic; in the upper thoracic region most of the bundles pass upward, in the lower part of the spinal cord the greater number of bundles pass in a downward direction. The terminal ganglionic cells in the organs probably have a separate origin.—*Arch. f. Microskop. Anatomi*, March 5, 1886.

MATERIA MEDICA, THERAPEUTICS, AND PHARMACOLOGY.

UNDER THE CHARGE OF

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THE BARK OF QUEBRACHO BLANCO AND ITS ACTIVE PRINCIPLES.

Under this caption, MM. CHARLES ÉLOY and HENRI HUCHARD publish, in the *Archives de Physiologie, Normale et Pathologiques*, etc., for April, 1886, an exhaustive paper. We lay before our readers some of the more important of their observations:

The active principles of quebracho are aspidospermine, quebrachine, aspidospermatine, hypoquebrachine, aspidosamine, and quebrachamine.

The physiological action and poisonous properties of the pure aspidospermine are shown in the following phenomena produced in the rabbit and the dog, by a two per cent. solution:

a. Action on voluntary movements. After doses of eight to fifteen centigrammes, successively administered, aspidospermine produces convulsions which first appear in the posterior members, and afterward become general; then muscular tremblings, and, when elimination does not take place, paralysis.

b. Action on sensibility. In no case has the peripheric sensibility been weakened. However, in the rabbit, they have ascertained the augmentation of the électrical excitability of the phrenic nerve.

c. Action on the circulation. Under its influence, the frequency of the cardiac pulsations became less; from 156 their number is diminished to 126. At the same time there were noticed an intensely red coloration and turgescence of the vessels of the pavilion of the rabbit's ear.

d. Action on respiration. Aspidospermine modifies the respiratory movements, first and temporarily in amplitude, later and permanently in frequency.

e. Action on temperature. The lowering of the rectal temperature is constant under the influence of this agent, and appears in relation at the same time with the activity of the elimination and with the dose administered. To judge of the antithermic value of aspidospermine, it is therefore necessary to take notice at the same time of the dose employed and of the activity of the elimination.

Physiological action and poisonous properties of the lactate of quebrachine. The investigations were made with a one per cent. solution on guinea-pigs and rabbits. The following are the conclusions:

a. Action on motility. Five or ten minutes after the subcutaneous injection, violent convulsions are observed; soon they give place to a paralysis of the posterior members, becoming general afterward. Besides, an almost constant phenomenon observed is the change in the guinea-pig's voice, which becomes hoarse, and later is lost.

b. The reflex excitability so increases that moderate excitations provoke distant violent muscular contractions. The sensibility does not seem to lessen.

c. The modifications of temperature are considerable. Five minutes after the first injection, the temperature of the guinea-pig diminishes, and when the doses are small the thermometer is lowered from five to seven degrees in the space of ninety to one hundred minutes. An increase in quantity of urine was observed. After large and manifestly poisonous doses, asphyxia and death occurred rapidly.

d. Respiration does not undergo modifications comparable to those induced by aspidospermine. After physiological doses, the rabbit preserved the rhythm and amplitude of the respiratory movements.

e. Action on the blood. The color of the blood is more variable; and, in grouping the observations, it was noticed that it is black when the animals succumb to asphyxia by paralysis of the respiratory muscles, and red when the thermogenic depression is more considerable.

f. The secretions increased every time when the experiment was sufficiently prolonged. Increase of the diuresis of rabbits and guinea-pigs and the humidity of the buccal cavity bear witness to the elimination of quebrachine by the buccal glands and by the kidneys. It is in direct relation to the lowering of the rectal temperature.

In equal weights and in the same experimental conditions, quebrachine is more active and more poisonous than aspidospermine; it possesses a greater antipyretic action, but does not modify the rhythm of the respiratory movements.

The physiological action and toxic qualities of aspidospermatine. The watery solution of lactate of aspidospermatine was used upon guinea-pigs and rabbits.

a. Under its influence the *motility* weakens; and if the dose is toxic, convulsions are produced. If the dose is less considerable, there is a muscular paresis of the extremities.

b. The sensibility is preserved.

c. The circulation is modified, and in the guinea-pig they have noticed acceleration of the cardiac pulsations.

d. The respiration preserves its rhythm in guinea-pigs. In an experiment upon a rabbit, we have remarked a decrease in the amplitude of the respiratory movements, compensated for by an increase of their frequency.

e. The temperature is lowered when the aspidospermatine is administered in successive doses. This lowering varies from three to six degrees in a space of time from nineteen to twenty minutes, so that in the relation of time and doses it is represented by the numbers 1, 1.5, 2.5. The aspidospermatine must then be regarded as a powerful antipyretic.

f. Its action upon the blood is interpreted by the changes of coloring like those which the aspidospermine produces. The blood of the veins becomes red, but only in cases of a gradual decline in temperature.

g. The intestinal and urinary secretions increase, and thus the slowness with which the toxic phenomena are developed is explained. The intestines and the kidneys then increase the elimination of this substance.

h. The first appearance of all these phenomena is observed in from three to five minutes after the subcutaneous injection; it is slower, and is only manifested between the sixteenth and twentieth minute, when diarrhœa and an intestinal hypersecretion exist.

By its antipyretic properties, aspidospermatine equals and even surpasses the other immediate principles of the bark of quebracho.

Physiological action and toxic properties of sulphate of hypoquebrachine on motility. A large dose (two per cent. solution) lessens motility, but in somewhat smaller doses induces tonic and clonic convulsions. It does not affect sensibility, nor has it any influence over the circulation; but it lowers the temperature considerably. The blood, when large doses have been given, assumes a vermilion hue; and is black when death has been caused by large doses that paralyze respiration. It is absorbed more rapidly than is aspidospermine and quebrachine, and the action begins in four or five minutes after its hypodermatic administration.

The following are the general conclusions arrived at by the authors:

1. The active principles of quebracho modify little the general sensibility of mammals (guinea-pig, rabbit, dog). Quebrachine, hypoquebrachine, aspidospermine, and aspidospermatine, in their pure form, do not weaken this function; but the residual products of their extraction appear to diminish it.

2. In some experiments, after the administration of aspidospermine and of quebrachine, the increase of the galvanic excitability of the phrenic nerve is proved.

3. Motility is variously affected. In large doses, aspidospermine provokes convulsions; in feeble doses, tremors; in massive doses, a rapid paralysis. A remarkable phenomenon is the hoarseness and loss of voice of the animals under observation, especially guinea-pigs. This phenomenon must be attributed to the paralysis of the tensor muscles of the vocal cords.

Quebrachine produces muscular paralysis more rapidly and more manifestly. Hypoquebrachine and aspidospermatine have a similar action, but less distinct than that of aspidospermine.

The residual products provoke a complete and rapid paralysis. Beginning at the extremities of the limbs, four or five minutes after the subcutaneous injection, this paralysis extends rapidly to the whole body, and alternates with tonic convulsions.

4. The circulation is not modified by the residual products nor by hypoquebrachine or quebrachine. By way of compensation, they have remarked retardation of the cardiac pulsations under the influence of the aspidospermatine injections.

5. It was of practical interest to review the work of preceding investigators from the point of view of the action of the principles of quebracho upon the respiration, since this bark has been extolled as a remedy for dyspnœa of various kinds.

Quebrachine changes neither the rhythm nor the extent of the respiratory movements. It is the same with the residual products and with aspidospermatine. The hypoquebrachine modifies them feebly. This *rôle* belongs especially to aspidospermine; it increases at first the extent of the respiratory movements in the proportion of 1 to 5 in eight or fifteen minutes; then, a moment after, it changes the rhythm in increasing their frequency in the relation of 11 to 12 (rabbit), or of 10 to 11 (dog). This increase persists during two, three, or even four hours.

This is not all; by increasing the dose, or in the absence of elimination, a disorder of the rhythm and a diminution in the extent of the respiratory movements are induced. Besides, in pursuing the experimental analysis of these phenomena, they have ascertained, first, that these modifications affected in the same way the respiratory movements of the thorax and those of the abdomen, for the parallel graphic traces of these two orders of movements show that the enlargement of the movements of the thoracic wall is already apparent at the beginning—that is to say, at the moment where the respiratory abdominal movements are not yet modified; secondly, that the number of costal respirations grow as 2 to 1; those of the ventral respirations increase as 1 to 1.

6. Consequently the aspidospermine modifies more energetically the frequency of the costal respiration than the frequency of the abdominal respiration. It is, then, right to consider it as the modifying agent of the respiratory movements, the most active among all the principles of quebracho.

7. All the active principles of quebracho have the power to modify the temperature. The residual products raise it; but this elevation seems to reënter in the category of the phenomenon of asphyxia. The aspidospermine of commerce lowers it from two to three degrees in the space of thirty to forty minutes; the pure aspidospermine following the numerical progression of ½, 1, 1½, etc., has relation rather with the rapidity of the elimination than with the size of the dose. The aspidospermatine makes the thermometric column descend three or six degrees in nineteen minutes, following the progression of 1, 1½, 2, or 2½. It is the same with the hypoquebrachine.

Of all these substances the most decidedly antipyretic is the quebrachine. In broken doses it lowers the temperature five to seven degrees in ten minutes. With the aspidospermatine, then, it possesses an antipyretic power superior to that of all the other active principles of quebracho.

8. The coloring of the venous blood merits attention. Black, when the animal suffocates under the influence of residual products; it is rose color or

currant-red by the action of quebrachine, of hypoquebrachine, of aspidospermatine, and of aspidospermine—that is to say, of the principles which lower the temperature. What is the nature of this blood modification? The spectroscopic and hematologic researches that we have made with the valuable aid of M. Henocque, and by his ingenious method have proved there is a quantitative diminution and not a qualitative change in the hæmoglobin. Further, the histologic examination of the blood globules has demonstrated their integrity; they preserve both their form and reactions at different periods in the course of these observations.

9. These principles increase the secretion of the kidneys, intestinal and salivary glands. Hypoquebrachine and aspidospermine cause diarrhœa, and act as diuretics; quebrachine increases diuresis; aspidospermine the salivary secretion of the dog, the urine of the guinea-pig and of the rabbit. The residual products have the same action upon the secretory activity of the intestine and of the kidneys. It is manifest that these are methods of elimination, as has been accounted for in examining comparatively the changes of the temperature, the respiratory troubles, and the variation of the blood color.

10. Finally, in relation to their toxic power, all these constituents of quebracho can cause death. The most toxic are the residual products; next come quebrachine, hypoquebrachine, aspidospermatine, and in the last rank aspidospermine. Death occurs, either in asphyxia, by paralysis of the muscles of respiration when the doses are large, or more slowly, by the arrest of the exchanges, when the doses are physiological and the elimination partial. Therefore by the graduated use of these principles, always with the exception of the residual products, useful effects can be obtained in therapeutics.

It is sufficient to say that the bark of quebracho is not a substance medicinally inert, and that, if it does not always respond to the excessive enthusiasm of its first patrons, it merits something more than disdain or indifference.

In the observations on temperature made by the authors of this paper, we find no allusion to the remarkable decline in the body heat of rabbits, which occurs when they are kept immobile. This circumstance must vitiate any conclusions reached by the experimenters, when so important a fact is overlooked. That this normal decline of temperature affected the results in this investigation is evident from some of the experiments, in which the decline took place without any apparent explanation of the occurrence.

CALOMEL IN THE TREATMENT OF HYPERTROPHIC CIRRHOSIS AND OTHER AFFECTIONS.

As an indication of that revival which is evidently taking place in the use of mercury, according to the old antiphlogistic conception, we place before our readers some of the principal points in a paper by SACHARJIN (*Centralblatt für die gesammte Therapie*, January, 1886) under the above caption.

In diseases of the biliary ducts, Sacharjin holds that we have in calomel the most valuable remedy which the present state of therapeutics affords. The special conditions in which it is most effective, are that catarrhal thickening which succeeds to the inflammation produced by the passage of gall-stones, and in hypertrophic cirrhosis. The cases of the former are those in which, after repeated attacks, in quick succession, of biliary colic, there is constant pain in the region of the gall-bladder, and much uneasiness is felt throughout the whole hepatic area, there being at the same time more or less feverishness. His practice consists in the administration, every hour or two, of grain doses until twelve grains are taken, after which should no cathartic action occur a dose of castor oil is given. During the administration of the calomel, and for a few days thereafter, the mouth is rinsed out with chlorate of potash solution, to avoid ptyalism.

Sacharjin, like many others, has seen the advantage of calomel in the treatment of *typhoid*. He gives it in the first week, not later than the eighth or the ninth day of the attack, and indeed at any time, should there be no diarrhœa. Calomel exhibited to induce a purgative effect, lowers the temperature for one or two days, and gives the patient a relatively quiet night or two. His rule consists in giving the calomel in grain doses hourly until twelve grains have been taken, after which, should it not purge, he prescribes castor oil. He rejects the theory of its action on the microbes of typhoid.

Sacharjin, during his first two years of practice, in treating croupous pneumonia, relied on digitalis, but finally became convinced of its inutility. He was equally disappointed in cold baths. Quinine to be effective in reducing the temperature must be administered in massive doses, and such quantity has a bad effect on the stomach and disorders the nervous system. The remedy which he has finally decided on is calomel, which he gives, as mentioned under the head of typhoid, except that in sthenic cases he begins its use with the onset of the disease. Very often he finds that the fall of temperature induced by the calomel determines the occurrence of the crisis.

Sacharjin finds that in *acute Bright's disease*, which develops idiopathically, without being induced by a previous infectious malady, even in those cases which occur in the puerperal state but are not due to puerperal infectious diseases, calomel given as already described has an excellent effect; a significant fall of temperature takes place, the renal pains subside and the urine increases in amount and improves in quality. If the temperature rises again, and the patient's strength permits, the calomel is given again.

In the various acute maladies for which Sacharjin prescribes calomel, the contraindications to its use are, besides the weakness of the patient, principally feebleness of the pulse and diarrhœa, especially if the stools are profuse and exhausting.

URETHAN: ITS PHYSIOLOGICAL ACTIONS, AND ANTAGONISM TO STRYCHNINE.

In an elaborate paper, which appeared in the *Bulletin Général de Thérapeutique*, for April 30, 1886, PROF. COZE, of Nancy, examines the action of the new hypnotic urethan. We give his conclusions:

Urethan is a carbamate of ethyl. Its solubility in water renders its administration easy. It has a decided hypnotic action, and in large doses determines complete muscular resolution and anæsthesia. It slows the pulse and lowers the temperature. It is free from local irritant action, and can be administered by subcutaneous injection. It does not coagulate the fluids of the body or derange nutrition. It is a functional antagonist of strychnine.

It is indicated in man in the case of convulsions in general, and especially in tetanus.

The experiments to determine the antagonism of urethan to strychnine were made on frogs, rabbits, guinea-pigs, and dogs, and were most striking in their results. Control experiments were not omitted. As respects the animals named, the antagonism was complete; it is not to be doubted that in man the same satisfactory results may be obtained. We can, therefore, unite with the author in urging on our surgical colleagues the use of this new medicament in tetanus.

TERPENE IN CHRONIC BRONCHITIS.

DR. RIEU, in the *Gaz. méd. de Strasbourg*, abstract in *Bull. Gén. de Thérap.*, April 30, 1886, gives the following conclusions from the clinical study of terpene as employed in chronic bronchitis:

Terpene is readily taken, as it is without odor or taste, and the dose, which is one or two grammes (fifteen to thirty grains) a day, has absolutely no injurious action. In bronchitis and bronchorrhœa, with abundant purulent expectoration, it greatly reduces the amount of matter brought up. The mucopurulent expectoration of phthisis is not affected by it. It is not superior to creasote, Venice turpentine, and other balsamic preparations of the same character. As it is so little offensive, we may conclude from the observations of Dr. Rieu that this is its chief merit compared with the other members of this group.

ACTION OF AMYL NITRITE.

L. SCHWEINBURG, in the *Centralblatt für die medicinischen Wissenschaften*, 1886, No. 1, p. 13, in a study of the effects of amyl nitrite, finds that there are differences in its action on the vessels, according to the period after administration and size of the dose. It is universally agreed that a fall in the blood-pressure is the result of the inhalation of this agent in animals. When the state of the vessels is examined by means of Basch's sphygmanometer, Schweinburg has ascertained that just at the moment the characteristic symptoms—flushing of the face, a sense of heat, and rapid beating of the heart and carotids—are produced, the blood-pressure rises. When the full effect is reached, there is always a fall in the blood-pressure, whether a full dose or a rapid succession of small doses be given by inhalation. Small doses given for therapeutical purposes always cause a rapid rising of the blood-pressure—by which statement we suppose he means doses not sufficient to cause distinct physiological effects.

PHYSIOLOGICAL AND CLINICAL ACTION OF GRINDELIA ROBUSTA.

An immense number of articles having appeared, especially in the American medical press, on the subject of grindelia robusta and its effects in curing and alleviating asthma, bronchitis, etc., DR. VASILI DOBROKLOWSKI, Chief of Prof. Botkin's Clinic in St. Petersburg, who seems well acquainted with all that has been written about this drug, finding that previous writers had confined their attention chiefly to its clinical effects, determined to investigate its physiological action on warm and cold-blooded animals.

Having carried out an elaborate series of sixty-eight experiments on frogs, dogs, and rabbits, and having administered it in ten clinical cases, he has come to the following conclusions (*Vratch*, 1886, No. 2):

1. The chief effect of moderate doses of fluid extract of grindelia robusta on the heart and circulation, is to diminish the number of cardiac contractions and to raise the arterial pressure.

2. The diminution of the number of cardiac contractions in warm-blooded animals is due to stimulation of the inhibitory nervous apparatus of the heart, and especially of that part of it which is situated in the medulla oblongata.

3. The elevation of the blood-pressure is caused by contraction of the bloodvessels, which is due partly to direct action of the extract, and partly to its stimulating effect on the vasomotor centres of the spinal cord, the medulla, and the cerebrum.

4. It diminishes the irritability of the different vasomotor nerves of the heart and vessels, as also that of the motor nerves and voluntary muscles. It is found that the irritability of the central apparatus falls more readily—*i. e.*, more quickly and with smaller doses—than the peripheral, and that the irritability of the nerves is more readily lowered than that of the muscles.

5. The therapeutic effect of the fluid extract consists in diminishing and regulating the cardiac contractions. Its diuretic action is not of a strongly marked character.

6. Its regulating action on the nerves of the heart is greater than that of digitalis, adonis vernalis, convallaria majalis, and even than that of chloral hydrate. Its dicrotic action is less than that of digitalis and adonis vernalis.

The author considers that in many heart cases in which other remedies have failed, a combination of grindelia robusta with adonis vernalis holds out a hope of success. The dose of the fluid extract given by him was thirty drops three or four times a day.

The foregoing observations of Dr. Dobroklowski are confirmatory of a physiological investigation made by the reviewer several years ago (Bartholow's *Mat. Med. and Therap.*, 5th ed., p. 609). He has not, however, referred in the paper from which the above abstract was made, to the pronounced cerebral effects of grindelia, more especially its hypnotic action. How far the changes in the intracranial circulation, due to the action of this agent on the vasomotor system, may be responsible, does not appear.

RESULTS OF ADMINISTRATION OF THALLIN, AND CAUTION AS TO ITS PHYSIOLOGICAL EFFECTS.

DR. KARST, of St. Petersburg, has made 202 observations on the effects of thallin, giving it in doses varying from 1½ grains to 10 grains. A reduction of from 0° to 4° C. occurred in 122 of these; usually the reduction was between 1° and 3° C., but in 14 cases it was between 3° and 4°. The interval which elapsed between the administration of the drug and the maximum fall of temperature varied from 1 to 4 hours, but was most commonly 1 hour. The duration of the reduction was in a few cases, especially where large doses were given, as much as 5 or even 6 hours, but it usually varied from 1 to 4 hours, the most frequent time being 2 or 3 hours.

The complications observed were rigors (25), perspiration (98), nausea (2), and vomiting (12). The author found that a severe rigor could be arrested by thallin given at the time. In a very few cases there were slight reductions in the pulse and respirations. The urine was of a dark brown color in cases where large quantities of thallin were taken. The urea diminished during the administration of the drug, and after this was discontinued increased to about the same amount as before, but after the lapse of a few days became much more abundant, from which the author concludes that the diminution of urea during the administration is not due, as Maragliano suggested, to decreased oxidation at that time, but to the retention in the system of the effete and poisonous products of the decomposition of the tissues, which Dr. Karst thinks should induce us to use thallin with caution. A similar result has, he remarks, been obtained by Dr. Jacubowitsch in the case of antipyrin, and he himself is now making experiments with resorcin, naphthalin, antipyrin, quinine, carbolic acid, trichlorophenol, salicylic acid, and cold baths, with the object of elucidating this question.

We are indebted to Dr. Maxwell, of Woolwich Common, England, for these translations from the Russian.

SURGERY.

IN EUROPE.

UNDER THE CHARGE OF

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RECENT SURGICAL LITERATURE.

So many additions have been made to the literature of surgery during the past few months that the more notable only can be dealt with.

PROF. VERNEUIL has issued the fourth volume of his "Mémoires de Chirurgie" under the title of *Traumatisme et Complications* (Paris, 1886). The work forms a very bulky volume. The style is verbose and diffuse, and the matter ill-arranged. The book, however, contains a vast amount of valuable clinical material, and forms a very important contribution to modern surgery. The first part is occupied with an account of injuries of various kinds based upon a great mass of clinical data. Then follows a masterly paper by Dr. Manoury on traumatic fever. Next succeeds a monograph by Dr. Dunoyer on the influence of intercurrent maladies and conditions upon injury. This subject Prof. Verneuil has made peculiarly his own, and it is remarkable that his work has excited so little attention elsewhere. The greater part of the book—no less than 300 pages—is devoted to erysipelas. The clinical features of the disease form the main points of the discourse, and rare forms of erysipelas, such as the recurrent and the hemorrhagic, are most exhaustively dealt with.